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Docket No.: KCC-14,026-CPA

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Robert James GERNDT
John Joseph SAYOVITZ

Serial No.: 09/240,524

Filing Date: 29 January 1999

Title: FLUID DISTRIBUTION SYSTEM FOR THERMAL TRANSFER ROLLERS

Group No.: 3743

Examiner: C. Atkinson

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RESPONSE TO THE RESPONSE TO NON-RESPONSIVE BRIEF

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the Response to Non-Responsive Brief mailed 31 March 2003, Applicants have enclosed the following:

- Three (3) true copies of the Appeal Brief Under 37 C.F.R. 1.192, as originally filed on 16 August 2002

I hereby certify that this correspondence (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on

22 April 2003.

22 April 03 — Eric Kurschke
Date — Signature

- A check in the amount of $320.00 to cover the Appeal Brief fee

The Commissioner is hereby authorized to charge any deficiency or to credit any overpayment to Deposit Account No. 19-3550. A duplicate of this sheet is enclosed.

Respectfully submitted,

Eric Krischke

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1 of 3

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Group No.: 3743

Examiner: Atkinson, C.

APPEAL BRIEF UNDER 37 C.F.R. 1.192

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Applicants herewith file their Appeal Brief in the above-identified case, pursuant to their Notice of Appeal filed 24 June 2002.

I. REAL PARTY IN INTEREST

The real party in interest is Kimberly-Clark Worldwide, Inc., the assignee of the present application (as recorded at reel 009870, frame 0823).

I hereby certify that this correspondence (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on

16 August 2002

16 Aug 2002
Date

Eric Kirschke
Signature

II. RELATED APPEALS AND INTERFERENCES

Applicants are not aware of any related appeals or interferences with regard to the present application.

III. STATUS OF CLAIMS

Claims 1-25 are pending in the application. The present Appeal is directed to Claims 1-25, as presented in Appendix A, which were finally rejected in the Office Action mailed 22 March 2002.

IV. STATUS OF AMENDMENTS

No amendment was filed subsequent to the final rejection.

V. SUMMARY OF INVENTION

The present invention is directed to a thermal transfer roller 10 having an outer cylindrical shell 12 which contacts a substrate being heated or cooled, and an inner cylindrical shell 14 which is coaxially positioned within the outer shell 12 to define an annulus 16 between the inner cylindrical shell 14 and the outer cylindrical shell 12 through which heat transfer fluid may flow. (Specification at page 10, lines 3-11).

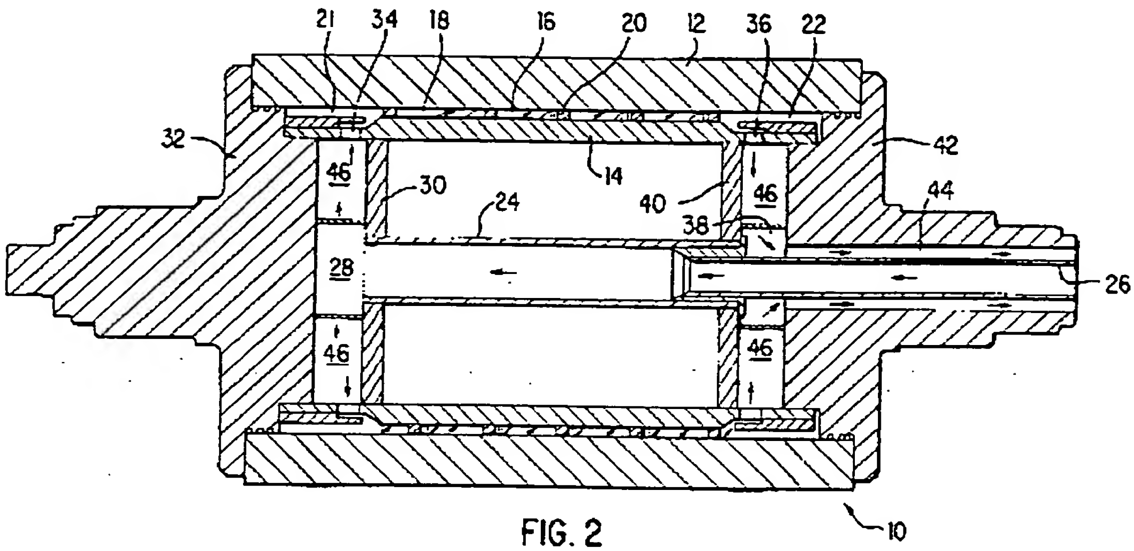

FIG. 2

As shown in Fig. 2, the thermal transfer roller 10 also includes a roll journal 32, 42 on one or both ends of the thermal transfer roller 10 and a passage 24 extending along a central axis of the thermal transfer roller 10 between an inlet end 21 of the thermal transfer roller 10 and an outlet end 22 of the thermal transfer roller 10. The passage 24 transfers heat transfer fluid from the outlet end 22 to the inlet end 21 and is in fluidic communication with the annulus 16. (Specification at page 10, lines 12-16).

A disk-shaped inlet chamber 28, defined between inner roller wall 30, first roll journal 32 and annulus 16, carries heat transfer fluid from the passage 24 to the annulus 16 via a cylindrical fluid entry slot 34 (Fig. 2) or a plurality of smaller, individual fluid entry openings 35 (Fig. 1) formed in the inner cylindrical shell 14. (Specification at page 10, lines 16-22). The heat transfer fluid then exits the annulus 16 via a cylindrical fluid exit slot 36 or a plurality of smaller openings

35 in the inner shell 14, and enters a disk-shaped outlet chamber 38, which is defined between inner roller wall 40, second roll journal 42 and the annulus 16. (Specification at page 11, lines 5-8).

Preferably, each chamber 28, 38 is provided with a plurality of channels 46, defined by walls 48 having a uniform thickness, extending radially outwardly from the passage 24 to the annulus 16; each channel 46 becoming progressively wider as it approaches the annulus 16. As each channel 46 transitions into the annulus 16, a large transition area is provided by the widened channels 46 to allow fluid to flow into the annulus 16. (See Specification at page 11, lines 14-17 and Fig. 1).

As set forth in the Specification at page 11, line 17 through page 12, line 13:

> "The purpose of channels 46 is to substantially prevent the heat transfer fluid from assuming an angular or spiral flow pattern within the end chamber, particularly within the inlet chamber 28, due to rotation of the roller. Angular flow patterns in the end chambers (particularly inlet chamber 28) cause increased fluid pressure and reduce the volume of fluid delivered by a typical constant-pressure fluid pump. The tendency for angular or spiral fluid flow increases with roller velocity, causing further pressure increase and further reduction in fluid volume. By substantially reducing angular or spiral flow within the end chambers, the drop in fluid volume (and heat transfer) at higher roller velocities is substantially diminished.
>
> The channels 46 are also designed to facilitate a substantially uniform, even discharge of fluid into cylindrical slot 34 entering the annulus 16 (Fig. 2) or into numerous smaller openings 35 entering the annulus 16 (Fig. 1). This is accomplished in part by providing channels 46 with a wider end approaching the annulus, and a narrower end approaching the passage 24. This configuration

permits the channels to be immediately adjacent or very close to each other at both ends, and minimizes the amount of space not occupied by channels. By minimizing the distance between adjacent channels approaching the annulus, a substantially even fluid discharge around the circumference of the annulus is maintained."

The combination of the present invention overcomes the problems associated with angular or spiral fluid patterns assumed by the heat transfer fluid in the end chamber and with uneven fluid distribution around the circumference of the annulus by providing a plurality of channels within each end chamber extending outwardly from the passage to the annulus; each channel becoming progressively wider as it approaches the annulus. As each channel transitions into the annulus, a large transition area is provided by the widened channels to maintain a substantially even fluid discharge around the circumference of the annulus.

VI. ISSUE

The issue presented for review is whether Claims 1-25 are patentable over U.S. Patent 5,292,298 ("Scannell") in view of U.S. Patent 4,658,486 ("Schönemann") or U.S. Patent 5,887,644 ("Akiyoshi et al.") or U.S. Patent 5,899,264 ("Marschke").

VII. GROUPING OF CLAIMS

All claims under consideration may be considered as a group and stand or fall together.

VIII. ARGUMENT

Claims 1-25 are Patentable over Scannell in view of Schönemann or Akiyoshi et al. or Marschke.

In the first Office Action in response to Applicants' Request for Continued Examination and in the final Office Action, mailed 22 March 2002, the Examiner rejected Claims 1-25 under 35 U.S.C. § 103(a) as being unpatentable over Scannell in view of Schönemann or Akiyoshi et al. or Marschke.

The Examiner alleges that Scannell in Figs. 1-3 and 5 disclose all the claimed features of the present invention with the exception of the passage extending between the inlet and outlet ends of the roller.

The Examiner further alleges that Schönemann, Akiyoshi et al. and Marschke disclose that it is known to have a passage between the inlet and outlet ends of a roller for the purpose of saving space and manufacturing costs (i.e. using less tubing in the plumbing of the fluid supply and removal system) by delivering and removing a fluid to and from only one end of the roller.

It is the Examiner's contention that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to

employ in Scannell the passage between the inlet and outlet ends of the roller for the purpose of saving space and manufacturing costs by delivering and removing the fluid to and from only one end of the roller as disclosed in Schönemann, Akiyoshi et al. or Marschke.

However, the references relied upon by the Examiner do not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. §103. Scannell, alone or in combination with Schönemann, Akiyoshi et al. or Marschke, does not teach or suggest the claimed limitations of the present invention. For example, Scannell, alone or in combination with Schönemann, Akiyoshi et al. or Marschke, does not teach or suggest: (a) a plurality of inlet channels in the inlet end chamber, each inlet channel having a first end closer to the passage and a second end closer to the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the first end and the second end thereof, as required by independent Claim 1; (b) a plurality of inlet channels in the inlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the narrower end and the wider end thereof and a plurality of outlet channels in the outlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each outlet channel becomes

progressively wider along a plane which includes a circumference of the outlet end chamber between the narrower end and the wider end thereof, as required by independent Claim 14; or (c) a plurality of inlet channels in the inlet end chamber, each inlet channel having a wider end closer to the annulus, and a narrower end, wherein adjacent inlet channels are separated by a wall having a substantially uniform thickness, as required by independent Claim 20.

Further, the prior art references provide no expectation to one having ordinary skill in the art of thermal transfer rollers, even combining the teachings in the prior art references, that the purpose of preventing angular or spiral flow patterns would be achieved with the intended result of improving the fluid distribution about the annulus. Applicants respectfully submit that no *prima facie* case of obviousness has been made. Thus, Applicants respectfully request reversal of the rejection of Claims 1-25 under 35 U.S.C. § 103 as being unpatentable over Scannell in view of Schönemann or Akiyoshi et al. or Marschke.

A. Scannell, Alone or In Combination With Schönemann or Akiyoshi et al. or Marschke, Does Not Teach or Suggest The Claimed Features of the Present Invention.

Applicants respectfully submit that the Examiner has over-simplified the present invention, when alleging that Scannell discloses all the claimed features of the present invention with the exception of the passage extending between the inlet and outlet ends of the roller. The thermal transfer roller of the present invention comprises an outer cylindrical shell and an inner cylindrical shell

which is coaxially positioned within the outer shell to define an annulus between the inner cylindrical shell and the outer cylindrical shell, and a particularly configured roll journal positioned on each end of the thermal transfer roller. Each roll journal comprises an end chamber including a plurality of channels each extending outwardly from the passage to the annulus and becoming progressively wider as it approaches the annulus. As each channel transitions into the annulus, a large transition area is provided by the widened channels to maintain a substantially even fluid discharge around the circumference of the annulus.

Scannell

Referring to Fig. 1, Scannell discloses a heat transfer roll 10 having an inner tubular body 12 and spiral ribs 14 positioned around the outer surface of the inner tubular body 12. An outer tubular shell 18 is fitted over the ribs 14 to form spiral channels 19 between adjacent spiral ribs 14.

The end section 20 has a plurality of radial bores 40. Each bore 40 is aligned with a hole 44 through the wall of the inner tubular body 12, one hole 44 being positioned between each pair of ribs 14, and each bore 40 intersecting the axial bore 29 of the end section 20. A blind bore 50 intersects each radial bore 40, as shown in Figs. 3, 4a and 4b. A cylindrical plug may be inserted into each blind bore 50 to block the associated bore 40 and prevent flow of liquid therethrough. Scannell at Col. 4, line 40 through Col. 5, line 17.

In an alternative embodiment, a long radial spacer 74 is positioned within a space between inner plate 72 and outer plate 70 such that the outer end of the radial spacer is adjacent hole 44. A short radial spacer 88 is positioned between the inner plate 72 and outer plate 70 and adjacent hole 44 opposing the long radial spacer 74. The outer end of each radial spacer 74, 88 abuts sealably against the inner surface of the inner tubular body 12 such that liquid passing to or from each hole 44 must pass through the constriction between the associated long and short radial spacers 74, 88. Scannell at Col. 5, line 68 through Col. 6, line 4.

In addition to not teaching or suggesting a passage extending between the inlet and outlet ends of the roller, Scannell does not teach or suggest: (a) a plurality of inlet channels in the inlet end chamber, each inlet channel having a first end closer to the passage and a second end closer to the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the first end and the second end thereof, as required by independent Claim 1; (b) a plurality of inlet channels in the inlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the narrower end and the wider end thereof and a plurality of outlet channels in the outlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each outlet

channel becomes progressively wider along a plane which includes a circumference of the outlet end chamber between the narrower end and the wider end thereof, as required by independent Claim 14; or (c) a plurality of inlet channels in the inlet end chamber, each inlet channel having a wider end closer to the annulus, and a narrower end, wherein adjacent inlet channels are separated by a wall having a substantially uniform thickness, as required by independent Claim 20. The channels of the present invention facilitate a substantially uniform, even discharge of fluid into the cylindrical slots 34 entering the annulus (Fig. 2) or into a plurality of smaller openings 35 entering the annulus (Fig. 1).

Conversely, Scannell teaches the use of spacers positioned about a hole to provide a tortuous or constricted path through which fluid flows. See Scannell at Figs. 5 and 7. Further, each channel 19 is in fluid communication with the axial bore 29 via **only one hole 44**. Due to the radial spacers 74 and 88 positioned about the one hole 44 to constrict the fluid flow through the hole 44, each channel 19 has an outlet hole 44 that is narrower than the inlet, i.e. Scannell does not teach or suggest a plurality of channels which progressively widen between a first end closer to the passage and a second end closer to the annulus, as required by Applicants' claimed invention, as set forth above. Because the fluid flow is constricted between the radial spacers 74, 88, the apparatus as taught by Scannell does not prevent the fluid from assuming an angular or spiral flow pattern nor does it facilitate a substantially uniform, even discharge of fluid into the

annulus, as in the present invention. Thus, the channels 19 of Scannell are similar to conventional radial channels that are increasingly spaced apart as they approach the outer surface of the roller, providing uneven fluid distribution to the annulus. See Applicants' Specification at page 3, lines 15-19. The channels 46 of the present invention minimize the distance between adjacent channels as the channels 46 approach the annulus to maintain a substantially even fluid discharge around the circumference of the annulus.

Scannell does not disclose all the claimed features of the present invention, with the exception of the passage extending between the inlet end and the outlet end of the thermal transfer roller, as alleged by the Examiner.

Scannell in View of Schönemann

As discussed above, Scannell fails to teach or suggest claimed features of the present invention, namely: (a) a plurality of inlet channels in the inlet end chamber, each inlet channel having a first end closer to the passage and a second end closer to the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the first end and the second end thereof, as required by independent Claim 1; (b) a plurality of inlet channels in the inlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the

narrower end and the wider end thereof and a plurality of outlet channels in the outlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each outlet channel becomes progressively wider along a plane which includes a circumference of the outlet end chamber between the narrower end and the wider end thereof, as required by independent Claim 14; or (c) a plurality of inlet channels in the inlet end chamber, each inlet channel having a wider end closer to the annulus, and a narrower end, wherein adjacent inlet channels are separated by a wall having a substantially uniform thickness, as required by independent Claim 20. Schönemann does not overcome the deficiencies of Scannell.

Schönemann discloses a calender roll 1 having a body 2 provided with a flange journal stub 5 at each end thereof. Each flange journal stub 5 is bolted or screwed to the roll body 2 so that a boss 8 fits snugly within a recess 9. Annular gaps 10 and 11 are defined between an end face 8a of the boss 8 and an end face 9a of the recess 9. The ends of an axial passages 4 open into these annular gaps and communicate with axial bores 12 and 13 extending through the respective flange journal stub 5. See Schönemann at Col. 6, lines 16-39.

Schönemann does not teach or suggest an inlet end chamber having a plurality of inlet channels having a first end closer to the passage and a second end closer to the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between

the first end and the second end thereof, as required by independent Claims 1 and 14. Further, Schönemann does not teach or suggest an inlet end chamber having a plurality of inlet channels in the inlet end chamber, each inlet channel having a wider end closer to the annulus, and a narrower end, wherein adjacent inlet channels are separated by a wall having a substantially uniform thickness, as required by independent Claim 20. Additionally, Schönemann does not teach or suggest an outer shell and an inner shell coaxially positioned within the outer shell to define a continuous annulus between an inner surface of the outer shell and an outer surface of the inner shell, as required by independent Claims 1 and 14; or a continuous annulus defined by an inner surface of an outer cylindrical shell and an outer surface of an inner cylindrical shell, as required by independent Claim 20. Rather, the annular gap formed between the cylindrical body and the flange journal stub provides communication between the axial bore and the axial passages, which are formed by boring through the solid calender roll body in a rectilinear manner. Thus, the fluid communication between the annular gap and the axial passages is constricted, as the fluid must flow from the annular gap through the individual axial passages spaced about the circumference of the calender roll body.

In one embodiment of this invention, Schönemann teaches the use of a one-piece stub capable of applying the driving torque to the calender roll without difficulty, in order to eliminate problems with baffles and displacement bodies.

Schönemann at Col. 7, lines 26-33. Further, contrary to the teachings of the present invention, Schönemann teaches away from heating the calender roll uniformly over its entire length. Schönemann at Col. 7, lines 37-41.

The combination of Scannell with Schönemann, if proper, would not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. § 103.

Scannell in View of Akiyoshi et al.

As discussed above, Scannell fails to teach or suggest claimed features of the present invention, namely the limitations of independent Claims 1, 14 and 20, as discussed above. Akiyoshi et al. does not overcome the deficiencies of Scannell.

Akiyoshi et al. discloses a casting roll for the casting of metal strips, having a plurality of load bearing members 23 having a relatively thick width provided on an outer periphery of the roll body 19 at a predetermined peripheral spacing with each other, are in contact with an inner periphery of the sleeve 20 and extend radially of the roll. Longitudinal cooling water passages 25 are provided as gaps formed between the roll body 19 and the sleeve 20. Akiyoshi et al. at Col. 4, lines 40-50. A plurality of distribution passages 30 extend radially outwardly from an end of a bore 28, as shown in Fig. 3. Each of the distribution passages 30 is connected to a corresponding cooling water passage 25, which can be formed simply by machining the grooves on the sleeve.

Akiyoshi et al. does not teach or suggest an inlet end chamber having a plurality of inlet channels having a first end closer to the passage and a second end closer to the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the first end and the second end thereof, as required by independent Claims 1 and 14. Further, Akiyoshi et al. does not teach or suggest an inlet end chamber having a plurality of inlet channels in the inlet end chamber, each inlet channel having a wider end closer to the annulus, and a narrower end, wherein adjacent inlet channels are separated by a wall having a substantially uniform thickness, as required by independent Claim 20. Additionally, Akiyoshi et al. does not teach or suggest an outer shell and an inner shell coaxially positioned within the outer shell to define a continuous annulus between an inner surface of the outer shell and an outer surface of the inner shell, as required by independent Claims 1 and 14; or a continuous annulus defined by an inner surface of an outer cylindrical shell and an outer surface of an inner cylindrical shell, as required by independent Claim 20.

Rather, Akiyoshi et al. teaches the use of conventional passages 30 that are increasingly spaced apart as the passages 30 approach the cooling water passages 25; thus, providing uneven fluid distribution to the passages 25. The conventional fluid distribution as taught by Akiyoshi et al. exemplifies a problem

associated with conventional rollers that the present invention is directed to overcoming.

The combination of Scannell with Akiyoshi et al., if proper, would not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. § 103.

Scannell in View of Marschke

As discussed above, Scannell fails to teach or suggest claimed features of the present invention, namely: (a) a plurality of inlet channels in the inlet end chamber, each inlet channel having a first end closer to the passage and a second end closer to the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the first end and the second end thereof, as required by independent Claim 1; (b) a plurality of inlet channels in the inlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the narrower end and the wider end thereof and a plurality of outlet channels in the outlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each outlet channel becomes progressively wider along a plane which includes a circumference of the outlet end chamber between the narrower end and the wider end thereof, as required by

independent Claim 14; or (c) a plurality of inlet channels in the inlet end chamber, each inlet channel having a wider end closer to the annulus, and a narrower end, wherein adjacent inlet channels are separated by a wall having a substantially uniform thickness, as required by independent Claim 20. Marschke does not overcome the deficiencies of Scannell.

Marschke discloses a steam heated corrugating roll 10 having an end wall with a series of steam transfer bores 36 which are circumferentially spaced around the roll axis and extend radially through spokes 49 between a shaft opening 35 and a steam header 36. Steam travels along steam tubes 16 and condensate is collected at a return end wall 40. The return end wall 40 has condensate transfer bores 41 which are spaced circumferentially around the roll axis and extend from bore openings in the inner shoulder 42 to condensate ports 43.

Marschke does not teach or suggest an inlet end chamber having a plurality of inlet channels having a first end closer to the passage and a second end closer to the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the first end and the second end thereof, as required by independent Claims 1 and 14. Further, Marschke does not teach or suggest an inlet end chamber having a plurality of inlet channels in the inlet end chamber, each inlet channel having a wider end closer to the annulus, and a narrower end, wherein adjacent inlet channels are separated by a wall having a substantially uniform thickness, as

required by independent Claim 20. Additionally, Marschke does not teach or suggest an outer shell and an inner shell coaxially positioned within the outer shell to define a continuous annulus between an inner surface of the outer shell and an outer surface of the inner shell, as required by independent Claims 1 and 14; or a continuous annulus defined by an inner surface of an outer cylindrical shell and an outer surface of an inner cylindrical shell, as required by independent Claim 20.

As shown in Fig. 3, Marschke teaches the use of conventional bores 41 that are increasingly spaced apart as the bores 41 approach the condensate ports 43. Like Akiyoshi et al., Marschke exemplifies a problem with conventional fluid distribution that the present invention is directed to overcoming.

The combination of Scannell with Marschke, if proper, would not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. § 103.

The references relied upon by the Examiner do not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. § 103. Scannell, alone or in combination with Schönemann, Akiyoshi et al. or Marschke, does not teach or suggest the claimed limitations of the present invention. For example, Scannell, alone or in combination with Schönemann, Akiyoshi et al. or Marschke, does not teach or suggest an inlet end chamber having a plurality of inlet channels having a first end closer to the passage and a second end closer to the annulus, wherein each inlet channel becomes progressively wider along a plane

which includes a circumference of the inlet end chamber between the first end and the second end thereof, as required by independent Claims 1 and 14. Further, Scannell, alone or in combination with Schönemann, Akiyoshi et al. or Marschke, does not teach or suggest an inlet end chamber having a plurality of inlet channels in the inlet end chamber, each inlet channel having a wider end closer to the annulus, and a narrower end, wherein adjacent inlet channels are separated by a wall having a substantially uniform thickness, as required by independent Claim 20.

Applicants respectfully submit that no *prima facie* case of obviousness has been made. Thus, Applicants respectfully request reversal of the rejection of Claims 1-25 under 35 U.S.C. § 103 as being unpatentable over Scannell in view of Schönemann or Akiyoshi et al. or Marschke.

B. The Prior Art References Provide No Motivation to Combine Scannell with Schönemann or Akiyoshi et al. or Marschke.

Scannell has been improperly combined with Schönemann or Akiyoshi et al. or Marschke. None of the prior art references suggests or implies the proposed inclusion of "a passage between the inlet and outlet ends of a roller for the purpose of saving space and manufacturing costs...," and the Examiner has pointed to no suggestion anywhere in the art for combining these references.

"When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the

references." In re Rouffet, 47 U.S.P.Q.2d 1453, 1456 (CAFC 1998). It is the Examiner that must show that there is a motivation to combine the references. In re Rouffet, 47 U.S.P.Q. at 1457-1458. In addition to the suggestion to combine the references, there must also be a reasonable expectation of success to those of ordinary skill in the art. "Both the suggestion and the reasonable expectation of success must be founded in the prior art." In re Vaeck, 20 U.S.P.Q.2d 1438, 1442 (CAFC 1991). Further, if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

In the Office Action mailed 22 March 2002, the Examiner alleges that "Scannell in Figures 1-3 and 5 discloses all the claimed features with the exception of the passage extending between the inlet and outlet ends of the roller" and identifies a motivation to combine Scannell with Schönemann or Akiyoshi et al. or Marschke because "Schönemann, Akiyoshi et al. and Marschke disclose that it is known to have a passage between the inlet and outlet ends of a roller for the purpose of saving space and manufacturing costs (i.e. using less tubing in the plumbing of the fluid supply and removal system) by delivering and removing a fluid to and from only one end of the roller." The Examiner concludes that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Scannell a passage between the inlet end and

the outlet end of the thermal transfer roller for the purpose of saving space and manufacturing costs by delivering and removing a heat transfer fluid to and from only one end of the thermal transfer roller, as disclosed in Schönemann, Akiyoshi et al. and Marschke. However, this purported motivation would not lead an ordinary person skilled in the art to combine Scannell with Schönemann, Akiyoshi et al. or Marschke to arrive at Applicants' claimed invention.

Applicants are not seeking to provide a passage between the inlet and outlet ends of the thermal transfer roller for the purpose of saving space and manufacturing costs. Instead, as explained above, Applicants seek to overcome the problems associated with angular or spiral fluid patterns assumed by the heat transfer fluid in the end chamber and with uneven fluid distribution around the circumference of the annulus. Further, the prior art references provide no expectation to one having ordinary skill in the art of thermal transfer rollers, even combining the teachings in the prior art references, that the purpose of preventing angular or spiral flow patterns would be achieved with the intended result of improving the fluid distribution about the annulus.

The present invention overcomes these problems by providing a plurality of channels in the end chamber, each channel having a first end closer to the passage and a second end closer to the annulus, wherein each channel becomes progressively wider along a plane which includes a circumference of the end chamber between the first end and the second end thereof. As each channel

transitions into the annulus, a large transition area is provided by the widened channels to allow fluid to flow into the annulus.

Scannell in View of Schönemann

Schönemann discloses that in order to reduce costs and to provide the heating medium so that it only heated the regions of interest, conventional calender rolls were developed which had a hollow interior and were connected at one end with appropriate fittings for feeding the medium to and removing the medium from the hollow calender roll. However, such conventional calender rolls had a problem with respect to acceleration and velocity of the calender roll. As the calender roll accelerated or was rotated at high speed, the baffle arrangements within the hollow calender roll tended to loosen and become liberated creating significant maintenance problems and down time. Schönemann at Col. 1, line 39-59. As discussed above, Schönemann attempts to overcome the problems associated with baffles and displacement bodies by forming an annular gap that is in fluid communication with a plurality of axial passages bored through a **solid** calender roll body in a rectilinear manner and spaced about the circumference of the calender roll body. Thus, Schönemann actually teaches away from combining an axial passage as taught in Schönemann with a hollow roller, such as taught in Scannell and the present invention.

Additionally, the flange journal stub 5 of Schönemann cannot be combined with the teachings of Scannell without rendering Scannell unsatisfactory

for its intended purpose of providing a heat transfer roll having spiral channels which can be easily cleaned independently. If the flange journal stub 5 providing the annular gap 10 or 11 is combined with the heat transfer roll 10 of Scannell, fluid communication between the axial bore and each spiral channel 19 cannot be blocked by the use of a plug, as taught in Scannell. Thus, such combination is an improper combination of prior art references for rejecting the claims under 35 U.S.C. § 103. *In re Gordon,* Id.

Scannell in View of Akiyoshi et al.

Contrary to the Examiner's contention, Akiyoshi et al. provides no motivation to combine Scannell with Akiyoshi et al. to provide a passage between the inlet and outlet ends of a roller for the purpose of saving space and manufacturing costs. Akiyoshi et al. does not suggest or imply the proposed inclusion of "a passage between the inlet and outlet ends of a roller for the purpose of saving space and manufacturing costs." Thus, it would not have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Scannell a passage between the inlet end and the outlet end of the thermal transfer roller for the purpose of saving space and manufacturing costs by delivering and removing a heat transfer fluid to and from only one end of the thermal transfer roller.

Scannell in View of Marschke

Contrary to the Examiner's contention, Marschke provides no motivation to combine Scannell with Marschke to provide a passage between the inlet and outlet ends of a roller for the purpose of saving space and manufacturing costs. Marschke does not suggest or imply the proposed inclusion of "a passage between the inlet and outlet ends of a roller for the purpose of saving space and manufacturing costs." Thus, it would not have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Scannell a passage between the inlet end and the outlet end of the thermal transfer roller for the purpose of saving space and manufacturing costs by delivering and removing a heat transfer fluid to and from only one end of the thermal transfer roller.

Therefore, the Examiner improperly used hindsight to combine Scannell with Schönemann or Akiyoshi et al. or Marschke to reject Claims 1-25 under 35 U.S.C. § 103(a). There is no suggestion or motivation in the art to combine them, and no reference reveals a reasonable expectation of success, to a person with ordinary skill in the art. In re Vaeck, 20 U.S.P.Q.2d at 1444. For this additional reason, the rejection should be reversed.

IX. CONCLUSION

Applicants respectfully submit that the combination of Scannell with Schönemann, Akiyoshi et al. or Marschke relied upon for rejection is improper and further that the combination of references relied upon, if proper, would not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. § 103. Accordingly, Applicants respectfully request the Board to reverse the rejection of Claims 1-25 under 35 U.S.C. § 103(a) as being unpatentable over Scannell in view of Schönemann or Akiyoshi et al. or Marschke.

A check for the fee required by 37 CFR 1.192(a) and 37 CFR 1.17(c), in the amount of $320.00, is attached hereto.

Respectfully submitted,

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APPENDIX A

1. A thermal transfer roller, comprising:

an outer shell and an inner shell coaxially positioned within the outer shell to define a continuous annulus between an inner surface of the outer shell and an outer surface of the inner shell;

at least an inlet end chamber in fluid communication with the annulus;

a passage in communication with the annulus, the passage extending between an inlet end of the thermal transfer roller and an outlet end of the thermal transfer roller; and

a plurality of inlet channels in the inlet end chamber, each inlet channel having a first end closer to the passage and a second end closer to the annulus;

wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the first end and the second end thereof.

2. The thermal transfer roller of Claim 1, further comprising:

an outlet end chamber in fluid communication with the annulus; and

a plurality of outlet channels in the outlet end chamber, each outlet channel having a first end closer to the annulus and a second end;

wherein the first end of each outlet channel is wider than the second end of the outlet channel.

3. The thermal transfer roller of Claim 1, wherein the inlet end chamber comprises a plurality of radially extending walls defining the inlet channels.

4. The thermal transfer roller of Claim 1, wherein the inlet end chamber comprises an insert including a plurality of baffles defining the inlet channels.

5. The thermal transfer roller of Claim 1, wherein the inlet end chamber comprises at least about 10 of the inlet channels.

6. The thermal transfer roller of Claim 1, wherein the inlet end chamber comprises at least about 20 of the inlet channels.

7. The thermal transfer roller of Claim 1, wherein the inlet end chamber comprises at least about 30 of the inlet channels.

8. The thermal transfer roller of Claim 2, wherein the outlet end chamber comprises a plurality of radially extending walls.

9. The thermal transfer roller of Claim 2, wherein the outlet end chamber comprises an insert including a plurality of baffles.

10. The thermal transfer roller of Claim 2, wherein the outlet end chamber comprises at least about 10 of the outlet channels.

11. The thermal transfer roller of Claim 2, wherein the outlet end chamber comprises at least about 20 of the outlet channels.

12. The thermal transfer roller of Claim 2, wherein the outlet end chamber comprises at least about 30 of the outlet channels.

13. The thermal transfer roller of Claim 1, wherein the annulus comprises at least one spiral channel.

14. A thermal transfer roller, comprising:

an outer shell and an inner shell coaxially positioned within the outer shell to define a continuous annulus between an inner surface of the outer shell and an outer surface of the inner shell;

an inlet end chamber positioned at an inlet end of the thermal transfer roller and in communication with the annulus;

a plurality of inlet channels in the inlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each inlet channel becomes progressively wider along a plane which includes a circumference of the inlet end chamber between the narrower end and the wider end thereof;

an outlet end chamber positioned at an outlet end of the thermal transfer roller and in communication with the annulus;

a plurality of outlet channels in the outlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus, wherein each outlet channel becomes progressively wider along a plane which includes a circumference of the outlet end chamber between the narrower end and the wider end thereof; and

a passage in communication with the annulus, the passage extending between the inlet end of the thermal transfer roller and the outlet end of the thermal transfer roller.

15. The thermal transfer roller of Claim 14, comprising at least 10 of the channels in each end chamber.

16. The thermal transfer roller of Claim 14, comprising at least 20 of the channels in each end chamber.

17. The thermal transfer roller of Claim 14, comprising at least 30 of the channels in each end chamber.

18. The thermal transfer roller of Claim 14, comprising radially extending walls in each end chamber which define the channels.

19. The thermal transfer roller of Claim 14, comprising a baffle insert in each end chamber, defining the channels.

20. A thermal transfer roller, comprising:

an inlet end chamber in communication with a source of fluid;

a continuous annulus in communication with the inlet end chamber, the continuous annulus defined by an inner surface of an outer cylindrical shell and an outer surface of an inner cylindrical shell;

a plurality of inlet channels in the inlet end chamber, each inlet channel having a wider end closer to the annulus, and a narrower end, wherein adjacent inlet channels are separated by a wall having a substantially uniform thickness; and

a passage in communication with the annulus, the passage extending between an inlet end of the thermal transfer roller and an outlet end of the thermal transfer roller.

21. The thermal transfer roller of Claim 20, further comprising:

an outlet end chamber in communication with the annulus; and

a plurality of outlet channels in the outlet end chamber, each outlet channel having a wider end closer to the annulus, and a narrower end.

22. A roller assembly comprising the thermal transfer roller of Claim 20, and a second roller.

23. A roller assembly comprising at least two thermal transfer rollers of Claim 20.

24. A roller assembly comprising the thermal transfer roller of Claim 21, and a second roller.

25. A roller assembly comprising at least two thermal transfer rollers of Claim 21.